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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,842	09/10/2003	James P. DeYoung	5697.57CT	5522

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EXAMINER	
CARRILLO, BIBI SHARIDAN	
ART UNIT	**PAPER NUMBER**
1746	

DATE MAILED: 01/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,842	DEYOUNG ET AL.	
	Examiner	Art Unit	
	Sharidan Carrillo	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-28,37-41 and 43-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *43-45* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

SHARIDAN CARRILLO
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 20-22, 24, 26-27, 37-38 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Mullee et al. (6277753).

Mullee et al. teach a composition for removing residue from a semiconductor substrate, the composition comprising a) a supercritical CO2 and 0.1 to 15% of a mixture of solvents comprising hydrogen fluoride and ammonium hydroxide (Lewis base, col. 2-3 bridging, col. 3, lines 1-7, claim 6). In reference to claim 20, Mullee et al. teach 0.1 to 15% of a mixture which can include hydrogen fluoride and ammonium hydroxide. Therefore, the concentration of CO2 is 75% to 99.9% which reads on the claim language. In reference to claim 21, the limitations are met by the teachings of Mullee. In reference to claims 22 and 38, the limitations are met since ammonium hydroxide has a pKa of 9.25. In reference to claims 24 and 40, Mullee teaches 0.1 to 15% alcohol and glycol. In reference to claim 26, Mullee teaches supercritical CO2 in a liquid state (col. 2, line 57). In reference to claim 28, refer to col. 2, lines 57-60 and the

limitations of density are inherently met because density is a property of the composition and Mullee teaches the same composition as the claimed invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 20-25, 27-28, and 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaartstra (6666986).

Vaartstra teaches supercritical etching compositions. In reference to claim 20, col. 3, lines 45-65 teaches a composition comprising amine (Lewis base), hydrogen halide (HF), carbon dioxide, co-solvents, and surfactants (col. 6, lines 1-15, col. 10, lines 39-40). The limitations of an adduct are inherently met since Vaartstra teaches the same composition as the instantly claimed invention.

In reference claims 20, 24-25, and 40-41, Vaartstra fails to teach the concentration ranges. Absence of criticality, it would have been within the level of the skilled artisan to adjust the concentration. In reference to claim 21, refer to col. 11, claim 10. In reference to claims 22 and 38, the limitations are met since the pKa is a chemical property of the composition and Vaartstra teaches the same Lewis base as the instantly claimed invention. In reference to claims 23 and 39, Vaartstra fails to teach triethyl amine. However, it would have been within the level of the skilled artisan to modify the method of Vaartstra to include triethyl amine since Vaartstra teaches amines and further teaches dimethyl amine (col. 9, lines 11-12). In reference to claim 27, refer to col. 4, lines 58-60. In reference to claims 28 and 42, since Vaartstra teaches the same composition as the instantly claimed invention and since the density is a property of the composition, one would reasonably expect the composition of Vaartstra to process the same density characteristics.

7. Claims 20, 22, 24-26, 28, 37-38, and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeSimone et al. (6763840).

DeSimone et al. teach a composition comprising liquid carbon dioxide and an adjunct. The adjunct can be selected from various adjuncts including HF acid, bases (i.e. secondary and tertiary amines), solvents, surfactants, and mixtures thereof. In reference claims 20, 24-25, and 40-41, DeSimone et al. fail to teach the concentration ranges. Absence of criticality, it would have been within the level of the skilled artisan to adjust the concentration. In reference to claim 26, refer to col. 3, lines 45-48. In reference to claims 22 and 38, the limitations are met since the pKa is a chemical property of the composition and DeSimone et al teaches the same Lewis base as the instantly claimed invention. In reference to claims 28 and 42, refer to col. 6, lines 17-25.

Allowable Subject Matter

8. Claims 43-45 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a nonaqueous composition comprising a 0.0001 to 20% by weight of pyridium poly hydrogen fluoride and 50-99.999 percent by weight of liquid carbon dioxide.

Response to Arguments

10. Applicant argues that while Vaartstra allows for combinations from the general listing of components, the skilled artisan would deem some combinations suitable, while others unsuitable. Applicant further cites col. 6, lines 5-11 arguing that Vaartstra teaches away from a combination since Vaartstra uses ammonia to etch titanium nitride,

while HF is used to removed silicon. Applicant's arguments are unpersuasive since in reading the reference as a whole, any and all combinations of solutions are possible.

11. Applicant argues that DeSimone fails to teach the combination of amines with HF. Applicant's arguments are unpersuasive since DeSimone (col. 4, lines 19-36) specifically teaches that a combination of HF with amine are possible.

12. Applicant argues that neither Vaartstra or DeSimone teaches solving solubility or stabilization issues of components in CO2. Applicant's arguments are not persuasive because they are not commensurate in scope with the claimed invention. Additionally, one would reasonably expect that Vaartstra or DeSimone would teach the combination of mixtures that are compatible with each other. Additionally Vaartstra teaches supercritical fluids having high solvating capabilities.

13. In reference to claims 37-41, applicant argues that Vaartstra is directed to the use of supercritical fluid compositions not liquid CO2. Applicant's arguments are not persuasive because Vaartstra teaches flowing of a supercritical CO2 in a liquid state and therefore the limitations of liquid CO2 reads on the teachings of Vaartstra. Additionally, col. 5, lines 1-2 of Vaartstra teaches that supercritical fluids are associated with compositions in the liquid state.

14. Applicant argues that DeSimone does not disclose non-aqueous compositions. Applicant's arguments are unpersuasive since DeSimone teaches CO2 in combination with an adjunct such as HF and amine.

15. Applicant argues that DeSimone is directed towards cleaning and not etching. Applicant's arguments are unpersuasive since applicant is claiming a composition, the

intended used is given no patentable weight. Additionally, applicant's arguments contradicts applicant's remarks made on the following page 8 of the response in which applicant states that Vaartstra and DeSimone are directed towards etching and cleaning processes. Further, the terms cleaning and etching are equivalent terms which are used interchangeably in the art to describe the removal of contaminants from the substrate surface.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on Monday-Friday, 6:00a.m-2:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sharidan Carrillo
Primary Examiner
Art Unit 1746

bsc

SHARIDAN CARRILLO
PRIMARY EXAMINER